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CONTENTS.

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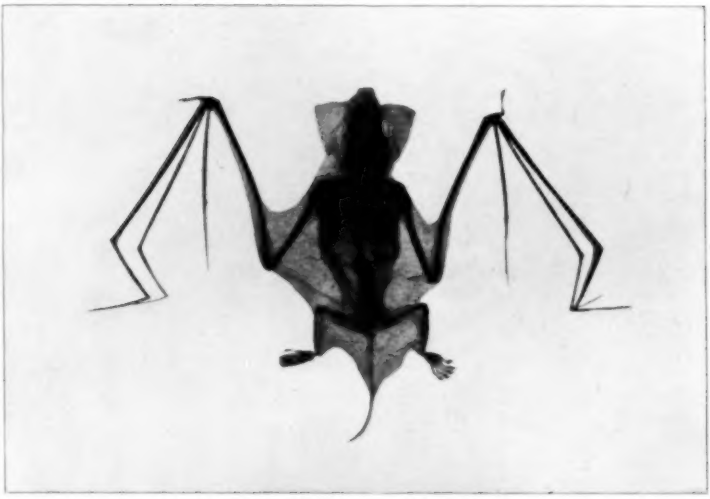
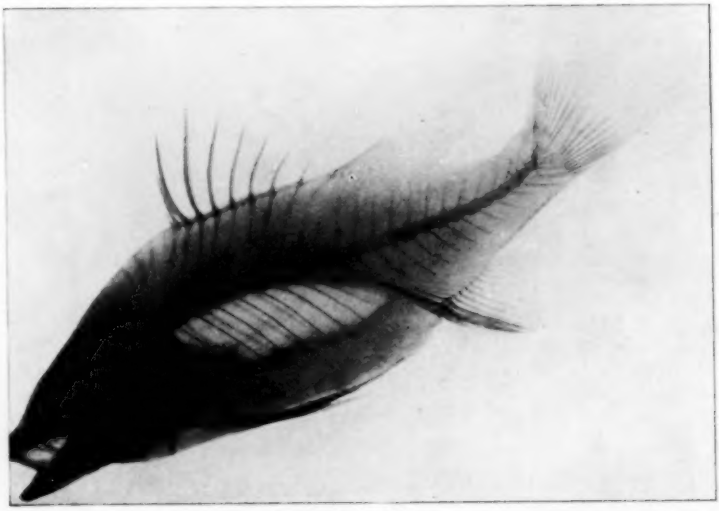
INDEX TO ADVERTISEMENTS.





ROENTGEN SCIOGRAPHS.

EXPERIMENTS AND NEGATIVES BY
MORRIS E. LEEDS,
J. STOGDELL STOKES.
PHILADELPHIA, PA.

AMERICAN JOURNAL
OF
PHOTOGRAPHY

THOS. H. McCOLLIN, Managing Editor.

JULIUS F. SACHSE, Editor.

VOL. XVII. APRIL, 1896. No. 196.

ORTHOCHROMATIC *vs.* ORDINARY PLATES.

THE question of true color values is a vital one with the professional photographer, and any plate that would best reproduce the graded contrasts of the original, all other things being equal, is the one sought for by the great body photographic bread-winners and experimentalists. The result of this research and demand was the orthochromatic or color-sensitive plate, which in connection with a light color screen gave wonderfully true results.

Now, after the lapse of nearly a decade, the claim is made in certain quarters (quasi-scientific) that equal orthochromatic effects are to be obtained with any ordinary make of dry plates this is, however, disputed by some makers, who claim that it is only with their special make of plate that such effects are to be obtained.

Both the above claims are in direct contrast to all accepted theory and practice during the past seven years. Each of the parties, however, pro and con, have their partizans and claim to have proofs of their assertions.

Now what are the facts of the case in view of the many discussions on the subject that have taken place at home and in England, as to the relative merits of orthochromatic *vs.* ordinary plates in giving the true color values of the object photographed?

From the early days of Fox Talbot down to the early seventies, the great desideratum of obtaining true color values by photography seemed impossible. Blue would come white, yellow appear black, while other colors were also apt to exert a somewhat similar perversity. In the year 1873, however, came the discovery of the orthochromatic principle, by Dr. H. W. Vogel, of Berlin. Here for the first time in the heliographic art we had a possible method of obtaining approximate color values. The principle was at once taken up in England as well as on the Continent, and somewhat later in our own country, and in the year 1886 we actually find an American institution making an award for the identical principle discovered and published by Dr. Vogel thirteen years previous. Now, after the lapse of another decade, the same receipitent of this award for "improvement in isochromatic photography," *i. e.*, the use of orthochromatized or special color sensitive plates to obtain true color values, in direct contradiction to his former methods, as we are informed, reads a paper, illustrated by spectrum photographs, by which he attempts to show that orthochromatic photographic effects could be secured with ordinary plates in connection with use of color screens, etc., and that the so-called orthochromatic plates were not material for the obtaining of true color values.

Strange to say, however, both the above theories may be correct. That the rendition of true color values depends upon the character of the dry plate employed is a fact that will be granted by all. Further, no person who buys a box of dry plates knows just how the emulsion is prepared; this is a secret of the manufacturers, every one of whom has his own carefully guarded formula and method of preparation.

Now, as every reputable maker aims to improve his special plates, what is to hinder any maker from using on his *ordinary* plate an emulsion to which has been added an orthochromatizing solution. Nothing whatever,—there is no law or usage whatever to compel a maker to label his product in any special manner. That is his option,—his chief object being to produce a superior plate and get a large share of trade.

Thus it may be easily seen that the claims of some special

make of plate may be partially correct, and yet not hold good with rival brands.

Further, experiments as to color values made with commercial dry plates bought at random can be of no scientific value whatever, as there is no guarantee that any two emulsions of the same brand are exactly alike, any more than those of rival makers. Then the experimentalist, not to say scientist, is completely in the dark, as he knows absolutely nothing as to the constituency of the emulsion that he is working with. It is all a mere matter of speculation by rule of thumb, and all such experiments are misleading and scientifically valueless.

As to the superiority of orthochromatized plates over ordinary wet or dry plates in giving true color values it is but necessary to refer to the deductions of such scientists as Dr. H. W. Vogel, of Berlin, Dr. Josef M. Eder, Charles Scolik and Maallman, of Vienna, Prof. Victor Schumann, of Leipzig, Dr. Adolf Miethe, of Rathenow, Dr. Stoltze, David, Schwier and numerous other well-known explorers in the department of photographic science.

The most exhaustive series of experiments to determine the value of orthochromatization, or the use of sensibilizers, was that instituted by Professors Mallman and Scolik, of Vienna, and forms the basis of Part III, of the latter's exhaustive treatise upon orthochromatic photography (*Die Orthoskiagraphische Photographie von Ludwig David and Charles Scolik, Wilhelm Knapp, Halle a. S. 1890*). Here plates are given in both monochrome and color, and show the effect of each particular sensitizing agent employed, the emulsion being the same in every case, merely the coloring matter being added.

The stock emulsion for this extended series of experiments was made expressly for the purpose by Dr. E. Zettnow, of Berlin The results shown leave no doubt whatever of the superiority of a properly orthochromatized plate over the same emulsion in its normal or ordinary condition, an opinion which is concurred in by every photo-scientist who has given the subject any extended attention.

JULIUS F. SACHSE.

ALL ABOUT ACETYLENE.

BY JAMES M. CRAFTS.

PROF. JAMES M. CRAFTS, of the Massachusetts Institute of Technology, read a newsy and instructive paper on the new illuminating gas, acetylene, before the Society of Arts, in the Kidder lecture hall, Walker building, Boston. The hall was crowded, and great interest was manifested in his statements and experiments. The presence of Boston men financially interested in acetylene, and the fact that they took notes of some figures and facts, go to show that the lecture was valuable and brought out new points.

Before beginning his experiments, Prof. Crafts briefly told what is generally known about the new gas and the discovery of carbocide of calcium, from which acetylene is made by the addition of water. By means of electricity, generated at Niagara Falls, the professor stated, it is expected that the carbide will be produced at a cost of $23.70 a ton. It is selling now for $100 a ton in New York, but as there is both limited supply and demand, this cannot be called the true price. Passing on then to the field covered by his experiments, Prof. Craft said:

"Boston gas has close to 25 candle power and Brookline gas a little more,—*i. e.*, five cubic feet burned in an hour gives a light equal to 25 candles. The same amount of acetylene gives 200 candle power, and the light is white, clear and steady—more like sunlight. Under the best conditions, therefore, acetylene is eight times better than the gas we now use. But either our burners are faulty, or we put on shades that absorb about one-half the rays. In practice, we get only about 11 or 13 candle power with our gas. The true test is that of the bill for the gas burned in a house for an extended period. We will know little until this house test comes.

"The acetylene flame clings close to the burner and heats it more rapidly than common gas. Because the light is close to the tip, however, it is valuable for locomotive headlights, and other parabolic reflectors, where it is important to have the rays

start close from the focus. The fishtail burner is not suited to acetylene."

The lecturer exhibited several tips of his own make, their construction permitting of the easy circulation of air and consequent gain of a larger volume of oxygen than tips in common use give.

"Pipes of smaller size and better quality than we now have may be used with acetylene," he continued. "The joints may be soldered and all leakage prevented. Leakage is dangerous, as I will show later on. There is no ammonia in acetylene to eat the grease around the stop cock and cause leaks such as now are caused by the ammonia in common gas.

"It is proposed to store the new gas in a liquid form in steel cylinders, where it will have a pressure of 600 or 700 pounds to the square inch. By means of a Pintsch reducing valve, an exceedingly ingenious device, the gas is allowed to escape at very slight pressure. Each cylinder also is provided with a mercury seal, so that if the pressure gets too great for safety the seal will break and allow the gas to escape. It is calculated that the seal will be broken in case of fire in the building. Should the cylinder become red hot, the gas would be reduced to its constituent parts—carbon deposited on the interior of the cylinder in the form of soot, and hydrogen. The hydrogen generated would have a pressure of 20,000 pounds per square inch — enough to burst the cylinder and cause great damage. More dangerous would be the probability of the breaking of the mercury seal and the discharge of the gas into the atmosphere. Three or four per cent of it in air would form a mixture of terrible explosive force. Therefore, the use of many of these cylinders in an office building is not to be commended."

After discussing the use of acetylene to enrich common gas the lecturer said he would pass over its poisonous and discuss its explosive qualities. Acetylene is more explosive than common gas. Using a piece of tubing for a popgun, he exploded two mixtures, one of common gas and air, the other of acetylene and air. Six per cent. of the acetylene in air had twice the effect of the same amount of common gas. A room, 20 per cent. of whose contents was acetylene, would be blown to pieces along

with the house. The study of the poisonous effects of the new gas, the lecturer thought, would be more practical if a 5 per cent. instead of a 20 per cent. mixture were taken. A man would not have opportunity to breathe the latter mixture if there was a fire in the room.

Equal parts of the acetylene and oxygen to the total weight of five grains in the popgun made a tremendous explosion. Five grains of gunpowder, the lecturer explained, would not have exploded with anything like that power. "The fact is—and here lies the secret of the great power of the gas—acetylene stores up heat at its birth. It is spontaneously explosive. The danger is slight, but it is there in a peculiar form. If we thrust a burning taper into the gas no harm is done. But we can get the explosive effect with fulminate of silver. The copper salts of this gas are also violently explosive. I prepared a compound of this kind for this lecture, but it exploded in the drying chamber. The fulminate formed by silver and acetylene explodes with a pressure of 600,000 pounds per square inch in 1-30,000,000th of a second. It is too capricious to be handled under water in the lecture room, although common fulminates are handled in that way. The danger in our homes would be in the formation of a copper salt near the acetylene tank.

"To sum up, I would say that the peculiar property of acetylene which gives it strength is its storing up of heat. I consider it very desirable that a great deal more work and study be put into acetylene than have been. Its use for gas engines is worth looking into. I hope the companies dealing in it will see their way clear for larger experiments. I would like to see a railroad train from headlight to rear lanterns lit with acetylene and given a thorough trial. A small village should be equipped with the cylinders. Only in this way can an old industry which has been built up by years of thought and labor be supplanted."

To Clean Looking-Glasses.—Sponge down the glass with gum and water, equal parts; then dust down with whitening, and finish with an old soft handkerchief.

COLOR SCREENS IN PRACTICAL PHOTOGRAPHY.

BY P. H. BURTON.

AS the use of orthochromatic plates is becoming more and more general for the best class of work, it may be well to consider what is the most efficient form of screen for use in connection therewith.

At the outset it will probably be readily conceded that, while the manufacture of orthochromatic plates has been brought to a high state of perfection and efficiency, the necessary screen for obtaining the full value of the plate lags behind in the background, and is enshrouded in as much mystery as a Salon masterpiece. What proportion of the workers of to-day are able, with any confidence, to select a screen from a dealer's stock that is really suitable for the requirements? Certainly the variety is not likely to be large enough to cause the confusion and hesitation one sometimes notices. No; the truth is, few workers know what a screen ought to be, or what they want it to accomplish. It would probably be amusing, if not instructive, if a collection of screens of all the colors of the spectrum could be placed before some otherwise capable workers for selection without any advice from the dealer; it might resolve itself into a matter of political bias. There are screens of optically worked glass of various colors and shades, single and compound; others of dyed films of both collodion and gelatine; and, again, a small glass trough holding a colored liquid, which is known as a cell. Colored glass plates are largely used, but the difficulty at present of getting colored glass with any degree of regularity, having the necessary properties, is so great, that I need not further allude to it here. A combination of such glasses is the subject of a patent. Colored films of gelatine or collodion are used by some workers with excellent results, but they are necessarily fragile and require much care to make. The cell has perhaps more advantages and fewer defects than any other form of screen.

It has been shown us that it is not so much a matter of any particular shade of color as the selection of a suitable coloring

matter. Some coloring matters have the power of cutting off certain rays of the spectrum which it is desired to reduce, or wholly eliminate, as the case may be, in a much greater degree than others, although apparently giving a similar shade of color; but whatever coloring matter is used, depth of color means increase of exposure, and it is quite possible to have a screen which, while requiring long exposures, is less efficient than one of a lighter shade, requiring much shorter exposures but composed of a suitable coloring matter.

As these remarks apply solely to the use of orthochromatic plates, which, as every one knows, are specially rendered more sensitive to the less actinic rays, and less so to the more actinic, we do not need a screen of such great power in cutting off the violet and ultra-violet rays as when experimenting with ordinary plates; but, even with orthochromatic plates, perhaps the simple aqueous solution of chromate of potash, so far as our present knowledge goes, is the most reliable of all; it is cheap, no skill is required in its preparation, and the tint can be varied to suit every class of plate and subject.

Plain glass cells can be obtained ready-made, but they are rather costly, and can be made at home with little trouble for a few pence. Of course, theoretically, the glass sides ought to be optically worked, but the results of many experiments made to determine this point have satisfied the writer that no one need hesitate to use a good quality of fine plate glass. Certainly the tests were made with the anastigmats of Zeiss and Goerz, but the reader may take it as a fact that optically worked glass is not absolutely necessary for pictorial work. For those who wish to make their own cells the following simple instructions will suffice:—Procure two plates of fine plate glass, about one thirty-second part of an inch thick, of suitable size to cover well the lenses with which it is to be used. Three inches square is a good size. Place between these two plates another piece of plate glass, the thickness you desire to make the cell, say, one-eighth of an inch, taking care the central plate is rather smaller than the two outer plates, say, two and a half inches square. Now place the three plates in a vise, such as is used for binding lantern slides,

carefully noting the contact is firm, so that the sides of the cell are perfectly parallel. Then cut four strips of sheet celluloid, of such width as the outer glasses, which can be cemented on them with celluloid varnish, laying the varnish carefully on the edges of the outer glasses with a small brush, then neatly laying on the strips of celluloid, which should just fit the sides. Make up three sides of the cell in this way, and leave in the vise until quite dry and firm, then take it out, and remove the central piece of plate glass by shaking it out of the open side. You now have a simple cell, which can be filled with any colored solution required, and used in the studio for experimenting with the top open; but it is better to make it tight by cementing on the fourth strip of celluloid after first drilling a small hole in the centre, of sufficient size to admit the tube of a pipette, which is a handy instrument for filling, emptying, and changing the colored solutions to be used. When the cell is charged, a small plug of india-rubber can be inserted in the hole, and it is then ready for field work of any kind.

The celluloid varnish is merely a jelly made by dissolving a bit of clean celluloid film in a small quantity of amyl-acetate. Being impervious to water, it answers the purpose admirably.

The particular coloring matter to be used for filling the cell must be decided upon by the worker; but, for those who have little knowledge of the subject, I advise a solution made up of one part pure chromate of potash to three hundred parts of distilled water as a commencement. The strength can be afterwards increased as the knowledge of the worker extends, and he can also experiment readily with other coloring matters, recording results for the benefit of his fellow-workers.

—*British Journal of Photography.*

Candy eating at the theatre is a decidedly bourgeoise practice.

Many a cosy corner that looks well on paper is a veritable dust collector in reality.

SOME CURIOUS ANIMAL MOVEMENTS.

CHRONOPHOTOGRAPHY, or the taking of instantaneous photographs of moving objects at regular intervals, sometimes exceedingly short, sometimes longer, has been used for some time to study the phenomena of movement in living creatures. Its recent application to exhibition purposes in the kinetoscope of Edison is familiar, but there the object is to combine the photographs so as to produce the illusion of actual motion, whereas for purposes of scientific study each of the series of pictures must be examined separately. Probably no greater collection of these pictures has ever been brought together in a popular work than is presented in the recently published book on Movement, forming No. 73 of the International Scientific Series, by Prof. E. J. Marey, of the College of France, a well-known expert in this method. With the pictures showing the motions of men and horses the public is totally familiar. Among the most wonderful of M. Marey's results are some of his series of moving fish and insects. The first represents a starfish turning over. Of this Prof. Marey says:

"Nothing is more fascinating than to watch the evolutions of a starfish which has turned on to its back in its attempts to regain its normal position. It finally succeeds by extraordinary feats of equilibration. It can be seen gradually insinuating one of its rays beneath its body, while it raises two others until its centre of gravity is outside the base of support. Then all of a sudden losing its balance, falls forward on to its neutral surface. There is now nothing left to be done except to extend its rays and gradually assume its normal position. It then moves along the bottom of the acquarium with a crawling motion peculiar to starfish. This somersault takes some time to accomplish, usually ten to twenty minutes; therefore at least an interval of one minute should be allowed between two successive photographs if the varioas phases are to be clearly depicted."

An interesting series is that illustrating the movement of a snake. The picture shows clearly how the undulations pass

from one end of the body to the other. Of the last picture, showing the movements of a spider in walking, M. Marey speaks as follows:

"Among the arachnids the four feet of each side alternate in their movements so that there are always two feet off and two feet on the ground, as can be seen in the case of the spider.

"To distinguish the feet on the ground from those which are raised, we illuminated an insect from above, so that the shadow of its legs was projected on to the white surface upon which it crawled. Under these circumstances the shadow of each foot which was in contact with the ground extended right up to the foot itself; on the other hand, when the foot was raised, a gap existed between the foot and its shadow.

"All these insects moved about on glass covered with paper or translucent muslin, and were viewed by translucent or reflected light. Their movements were directed by means of two sheets of glass, which were arranged so as to be parallel and vertical, and thus to prevent them from leaving the desired track. . . In a collection of a great number of photographs of this kind one will find the necessary elements for the study of comparative physiology."

THE BROOKLYN ACADEMY OF PHOTOGRAPHY.

FEW pursuits in which men and women have engaged primarily for diversion have developed so many substantial advantages as photography. Racing often leads to gambling. Athletics may be overdone, and injure instead of benefiting their devotees. Whist as played to-day is too severe mental exercise for a good many people when their day's work is done. And amateur theatricals, like trolley parties, have only an ephemeral existence. They haven't what St. Paul called "the gift of continuance." Of the thousands who have experimented with a camera, some have given it up through natural instability of temperament, some because they could not make a decent picture, and some from lack of time. But those amateurs who have

practiced the art of photography long enough to become at all proficient therein have almost invariably found the intellectual, social, esthetic and other rewards greater than they had foreseen.

One brings home from his outings souvenirs of pleasant times and pleasant places, corroborative detail wherewith to substantiate his fish stories, and the means of affording serious entertainment to friends. But, more than this, the man with brains enough to have a hobby can turn his art to account in photographing sun spots, eclipses of the moon, bolts of lightning, curious natural history specimens, odd bits of architecture and engineering work, or any other unique and interesting object which he encounters in his rambles. Scenes of historic interest, like naval parades, the launches of vessels, the dedication of monuments, together with such unhappy subjects as railway wrecks and the ruins left by fire, may thus be recorded more fully and accurately than would otherwise be possible. Both commercial and professional interests are often subserved by lecturers, surgeons, military officers, manufacturers, inventors and stock-raisers, with the aid of a camera; and, finally, every one who makes pictures for any of these purposes is always sure to have his perceptive faculties sharpened, his sense of the beautiful in art and nature intensified, and his general information widened by the habits of observation cultivated in connection with this useful and delightful pursuit.

While doing much of his work alone, the amateur photographer needs to co-operate with others of his class for study, the use of costly apparatus, and competitive exhibitions. Hence the value of such an organization as the Brooklyn Academy of Photography, whose clubroom and darkroom are situated in Montague street, at the corner of Clinton. This society has an excellent library, is now installing the means of enlarging and reducing pictures by electric light, and is animated by a progressive and liberal spirit. The membership numbers about one hundred, of which, by the way, a large proportion are physicians and surgeons. One of them, Dr. H. M. Lewis, of Remsen street, is now president. Every Monday evening is a sort of club night at the Academy's headquarters, and on every other Monday there is an exhibition of either lantern slides or prints. On these occasions

trifling prizes are awarded for excellence, and more substantial recognition of merit is bestowed at the close of each season. Occasional lectures or "demonstrations" are given during the winter to enlighten the society in regard to new processes and apparatus. "The Technical and Demonstrative Committee," as it is called (August Goubert, chairman), will, for instance, arrange for two talks ere long on the methods of preparing "zinc etchings" for newspaper illustration, and "half-tone" pictures for weeklies and monthlies. Another committee is charged with the responsibility of securing the presence of several members on historical occasions; and much unorganized enterprise is also shown in getting pictures either for this class or of comparatively unknown bits of lovely scenery in and near Brooklyn, and unforeseen incidents, like the City Hall fire. In this manner the press and public have often been furnished with information not otherwise attainable. The Brooklyn Academy of Photography, according to the *Standard Union*, is always glad to welcome new members.

ANOTHER NEW PHOTOGRAPHIC DISCOVERY

CLOSE upon the announcement of Prof. Roentgen's discovery in photography comes that of another that will interest astronomers even more, although it has no sensational features and will hardly take up much space in the daily press. As stated by Mr. D. E. Packer in a letter to *Popular Astronomy*, March, written from South Birmingham, England, it is that metallic films and foils will transmit best that part of the solar light that affects a photographic plate most easily. The light of the corona —that mysterious envelope that shines out so clearly during an eclipse, but is ordinarily invisible—is of this character, while a smaller proportion of the light from the solar disk consists of it. Hence the corona may be photographed through such a film, which transmits just that part of the light that is wanted, and effectually screens from the solar glare. The results thus far obtained are thus recorded by Mr. Packer:

"The results obtained are so remarkable and the recorded changes so great and rapid that great caution had to be exercised till a sufficient mass of confirmatory evidence could be obtained to justify this announcement. . . .

"The earlier photographs were principally taken with a camera of four-inch aperture, the metallic screens employed being tin and lead foil and sheet copper. Prominent equitorial extensions over the regions of active sun-spot groups are the chief features of these pictures.

An immense advance was made by the introduction of a small clear aperture (pin-hole) in place of the camera lens. As expected, a far greater mass of detail, more sharply definite and exhibiting a considerably greater extension of corona, was obtained by this method. Generally three or four exposures by both methods, and through different media, were obtained on the same date, and the more prominent details invariably found to agree—a proof of the objective reality of the phenomena."

The inferences drawn from a study of the photographs already taken are as follows:

1. "A very close and intimate connection with contemporary sun-spots and sun-spot groups, active sun-spots, especially when near the sun's limb, indicated by enormous radiations over the particular region of activity. It may be regarded as an axiom that 'every sun-spot has its coronal ray,' as every prominent radiation may be easily assigned to its particular spot to which it invariably points.

2. "That the well-known typical spot-maximum and spot-minimum coronal phases alternate pretty rapidly, apparently synchronizing with observed phases of short-period spot activity and quiescence.

3. "That many of the most prominent radiations exhibit a decided helical structure, two or three convolutions in some instances being dtstinctly traceable—a surprising and unexpected feature.

5. "The great photographic strength of the coronal rays as compared with the feeble image of the solar disk in the photograph.

5. "That the corona is an electrical phenomenon. The remarkable association between sun-spots and coronal radiations is, perhaps, the most important feature of the research. If, as appears, we are able to associate particular sun-spots with their coronal rays, and study the variation of both at the same time, an immense advantage will have been gained."

EDISON'S "FLUOROSCOPE."

ACCORDING to the daily press Mr. Edison was visited in his laboratory at Orange, where the Wizard is putting the finishing touches to apparatus designed to be of valuable aid to surgeons in connection with the mysterious rays.

To make photographs quickly of bones in the body was the idea on which Mr. Edison was working. He experimented in various ways with chemicals bound to act quickly and the result of his work was the fluoroscope.

It was the fluorescence that Mr. Edison was looking for, and out of eighteen hundred chemicals he found seventy-two that would fluoresce with the X rays, and the one which was found to produce the most marvelous results was tungstate of calcium crystals. In the course of a few experiments he found that he could in a moment with the naked eye see what had previously taken a long time to show by means of the photographic plates.

Mr. Edison then described the practical application that he had made of his discovery.

He had a box on the principle of a photographic camera, wide at one end and narrow at the other. At the smaller end he attached pieces of cardboard to fit over the eyes and exclude all light. On the larger end of the box, which, by the way, he has called the "fluoroscope," he placed a piece of cardboard, and on the inner side of the cardboard pasted a piece of white cloth which had been coated with tungstate of calcium crystals. His laboratory, as everybody knows, is probably the best equipped in the world, and it does not take him long to get apparatus ready for any experiment.

He placed a vacuum tube of his own make on the mercury pump, and after it had been exhausted of air, turned the current of electricity into it from an induction coil. The tube fluoresced in a moment. Mr. Edison put his hands in front of it, placed the fluoroscope over his eyes, and saw at a glance that on the white cloth there were distinctly pictured the bones of his hand. Not a vestige of flesh was visible, so that it was clearly demonstrated that with the use of the fluoroscope and Crookes tube a surgeon could determine in a moment the nature of a fracture in the limb of a patient or the location of a foreign substance, like a bullet, in the bones.

He held a pine board an inch and a quarter in thickness in front of the fluoroscope and placed my hand between it and the tube. I looked into the fluoroscope and the white cloth was as bright as though turned toward the sunlight, but on it the bones of my hand appeared in all their distinctness. The marvelous effect had been produced of throwing the shadow of the bones of my hand through an inch and a quarter plank in a fraction of a second. There may be some things more astounding than this in science, but it is difficult to imagine what they can be, yet, even with these astounding results before him, Edison said yesterday afternoon that the possibilities of Roentgen's discovery were still in their infancy.

"With the fluoroscope," he went on, as he watched one of his workmen busy with the apparatus he has designed for hospital use, "as I have already said, a surgeon should be able to determine in a moment, in case a man has been shot, just where the bullet has lodged, and operate accordingly. There is no occasion to take photographs, shadowgraphs or radiographs. I stopped that long ago. You see for yourself the fluoroscope does the work in a moment."

Turning from the fluoroscope, Mr. Edison spoke of the portable box he had made to go with it. He explained that the idea was that a surgeon or a physician, equipped with the fluoroscope, could take the box mentioned with him to the house of a patient or to any place where his services were required. Wonderful as this apparatus is, it is surprisingly simple. A wooden box con-

OFF THE JERSEY COAST.

A LANCASTER COUNTY FARM-HOUSE.

HAND CAMERA WORK.

NEGATIVES BY MASTER HAROLD F. DIFFENDERFFER,
LANCASTER, PA.

tains it all, and this box has a cardboard cover, cardboard having been found to be peculiarly porous to the rays. In the box, which is all a delicate piece of mechanism, there are three things—a battery stored with electricity, an induction coil and a vacuum tube. When a surgeon wishes to see a fractured arm or leg so that he may be guided by his eyesight rather than by his touch in the setting of a broken limb, all he has to do is to put the limb on the cardboard cover of the box, start the electrical current into the vacuum tube, put the fluoroscope over his eyes and see at a glance the nature of the injury he has to treat.

It should be said that the fluoroscope is fitted in one case, with a handle, so that the person can hold it to his eyes, and in another it is fitted with straps so that it can be tied around the head of the surgeon using it, and thus leave his hands free for the operation.

"The appliance," said Mr. Edison, "is for immediate use, and is a valuable aid to surgery and would be invaluable in a hospital. Suppose a man should fall and break his arm and be taken to a hospital. It is very important that this fracture should be properly set at the start. If this is not done the arm may have to be broken again and again until it is properly set, which, of course means so much extra pain for the patient and a wearisome postponement of his convalescence. With the apparatus you see here and the fluoroscope a surgeon can detect the nature of the fracture in a moment and set the arm accordingly."

Mr. Edison with the fluoroscope has been able to see the bones of his hand through an eight-inch plank, and there would seem to be no reason, therefore, why we should not also see them through a brick wall.

The fluoroscope is the sensation of the day at the "Wizard's" laboratory, and all the workmen there are using it to see what their bones look like. Every once and a while one of them goes into the dark room where Mr. Edison has his Crookes tube and fluoroscope to look at the bones of his hand.

One of them said: "That is what I call a great boon to humanity. Suppose a smash-up occurs on a railway and surgeons are sent to the scene and find people with broken legs and

arms. If they take with them the fluoroscope and the portable box containing the Crookes tube they can, on the very scene of the accident, set broken limbs as readily as in a hospital, and thus save the injured ones an untold amount of suffering. It is indeed a wonderful aid to surgery."

[All of the above certainly reads very nice, but still it smacks greatly of the sensational journalism, and until we hear of practical demonstrations by scientists of note and reputation, who will show results, the glowing account of the fluoroscope will form a companion to the bright fairy tales about color photography which so persistently go the rounds of the sensational press of the day.—ED.]

Dado of Photographs.—Picture framing is always expensive. One frame is not such a item, but when it comes to a dozen photographs, water colors or engravings, one stands aghast at the total cost. In many new houses frames go in with the rent, so to speak. In rooms which are wainscoted lengths of glass are placed so that the upper molding forms the base of the frame and another molding is placed at the top to hold the glass. How dear to the heart are the hundred photographs collected abroad! What more calculated to give a constant joy than these "all in a row" around the library or over the book-shelf in one's own den? These may be slipped behind the glass, as the moulding is easily removed, and thus a dado is made for all to admire. If a separation is desired a narrow moulding to match is easily obtainable. A firm hand with a penknife and a few tacks only are needed, and a room is transformed. Another way is a moulding placed half way between floor and ceiling, with the photographs set upon it, and a long ribbon in the tone of the room is stretched above and holds them in place. A charming effect is obtained in forming a background of velvet, its own width, and fastening pictures, simply framed in passepartout, upon it, with large-headed brass tacks. In a young girl's room, recently "done" by a well-known decorator, the only color was yellow. A few fine engravings were framed in white and gold, but the wires by which they were suspended were covered with yellow ribbons, and the hooks were hidden by a huge rosette.

HINTS ON RETOUCHING.

EXCESSIVE retouching is far from desirable, but there are few negatives made that could not be improved by a judicious use of pencil or spotting brush. It may be an excessively marked wrinkle in the face of a portrait, or an intense shadow cast by a hat, that spoils a picture by directing attention to the defects; these should be modified so as to give a harmonious result.

An elaborate outfit is not necessary, all we require being a retouching desk, a couple of lead pencils, some "medium," a fine sable pencil, and some water-colors.

The desk is simply an inclined board with a hole cut in it; this is to be placed with its back against the light and forms a support for the negative. The part of the negative to be retouched is placed over the hole in the board, in order to permit the light to pass through it. It is usual to surround the head with a focussing cloth to prevent extraneous light from interfering with that passing through the negative. Such desks can be bought at a reasonable price from most dealers, or they can be extemporized easily enough out of a wooden box.

The best kinds of pencils are those provided with refills, as it is much easier to keep them properly pointed than when mounted in solid wood. They have also the advantage of always remaining a uniform length.

A piece of cigar-box wood, about 6 inches by 1, covered with a strip of fine emery cloth, forms an admirable sharpening board for pointing lead pencils. The leads must be brought to an extremely fine and tapering point—*at least* an inch in length. The most useful leads for elementary work are HB and HH.

We must also have some means for giving a "tooth" or "bite" to the negative, otherwise the lead would refuse to adhere. In some cases, portraits especially, a very slight tooth is sufficient, because perhaps only a little lead is required; the retouching is then generally done upon the film. The gelatine film must be prepared with a medium made as follows:

Dammar,	30 gr.
Turpentine,	1 oz.

or,

Dammar,	10 gr.
Canada balsam,	5 gr.
Turpentine,	1 oz.

One drop of either of the mixtures should be allowed to fall upon the part of the film to be retouched, and then rubbed briskly with a piece of cambric stretched over a finger. It must be rubbed in a series of small circles, which should be continued until the medium is dry. In about five minutes it will be ready to receive the lead pencil. After retouching on this surface, the negative should be warmed over a lamp or before a fire until it is quite hot; this will fix the lead.

Should more work be required, the negative can then be varnished, the varnish prepared with medium, and further lead pencil applied.

Negatives sometimes require far more and bolder work than could possibly be applied to such a surface, but those cases are comparatively rare.

A negative that is to be loaded with retouching in lead should first receive a good coat of hard negative varnish, and, when quite dry and hard, then be ground down with an abrading powder. The following is a useful mixture for this purpose:

Powdered resin,	1 part.
Powdered cuttle-fish bone,	2 parts.

The ingredients must be well ground together and then sifted through silk, or other fine material, to intercept any particles of grit that might possibly be present.

This mixture can be conveniently kept in a pepper castor, and a little sprinkled upon the varnished negative when required. It should be rubbed in with a pad of wash leather, the point of a finger, or palm of the hand. A steady circular motion will very soon abrade the surface enough to give a perfect matt surface, upon which almost any amount of lead pencil can be deposited. The retouching can be "fixed" by heating the negative, as in the former case.

And now a few words as to the "touch" required when using lead pencils on a negative.

Place the prepared negative, film side towards you, on the retouching desk and cover your head and the board of the desk with a focussing cloth so that you can see little or no light except that which passes through the part of the negative to be retouched.

It is sometimes an advantage to reduce the aperture in the retouching desk by covering the negative with a mask of black paper pierced with a hole about an inch in diameter. This tends to concentrate the light upon the part of the negative under operation.

If only a little retouching is required, take the HH pencil (drawn to a very long fine point), and examine the negative under the cloth. You will probably notice a lot of semi-transparent spots due to pimples or freckles almost invisible in the original sitter. These must be removed, and should have first attention, while too heavily marked lines should be softened down by slight retouching. Before you touch the negative with your pencil, pause just a moment and remember that you must *not* bear on. A number of light *touches* of the pencil point will be required to remove each pimple, and although there is apparently no sign of any lead adhering, you will notice the almost magic disappearance of each small defect under many small light dots of the pencil. Do not overdo it; the temptation may be great, but confine yourself to very small "full-stops," so small as to require about five or six to remove a freckle. Begin at the top left-hand side of the face (if a portrait), and gradually work diagonally downwards, touching out only pimples and freckles.

Lines and wrinkles may next be lightly modified, but do not "bury truth in a leaden coffin." Remember that lines are all indicative of character. A face that is retouched out of all semblance to anything but a waxen dummy is an eyesore to a student of humanity, so pray do not overdo it. In reducing the heaviness of facial lines, the retoucher should turn his negative about with the left hand so that he can work with the greatest ease to himself. The black lead lines must go in the same direc-

tion as the facial lines, not across them, if we would avoid a patchy disagreeable effect!

Different people adopt different styles of stroke in retouching of all kinds, but I think the beginner will be most likely to have really good results if he lightly covers the lines of the face with a series of double-tailed commas—that is, a comma with a fine beginning and a fine ending, but with a slight curve in the centre. These may be diversified by a few ordinary commas as may be required; sometimes a series of small crosses, with the longer strokes running the same way as the wrinkle, will give capital results. Whatever style of stroke is adopted, bear in mind two things: keep a light guiding hand, and work in the longer direction of the facial line.

I shall say nothing about "modeling" the face, because my private opinion is that, if ordinary care is exercised in lighting the sitter, the human face is already modeled far more perfectly than can be done with a pencil. It may be well to point out what lines will require slightly softening, (*not obliterating*); for instance, the lines about the mouth and the line of shadow between the lips, the nostrils and their corners, the shadow cast by the eyebrow, "crow's-feet," the ear and its shadow, the hand and its knuckles. All these should be carefully examined as retouching proceeds.

When landscape negatives require pencil work, abraded varnish will be found the most rapid method for applying lead pencil. In this case the HB pencil (or even a softer one) will be found serviceable, and the retouching can be nicely softened with a paper stump. Stumps of this kind are easily made by rolling blotting paper into a tight wad about the thickness of a pencil, and then sharpening it with a pen knife; they can be bought for a few pence if preferred.

Should still broader effects be required than can be thus obtained, the glass side of the negative must be coated with matt varnish made of—

Sandarac, - - - - - -	90 grains.
Mastic, - - - - - -	20 grains.

Methylated ether, - - -	2 ounces.
Benzole, - - - - - -	6 drams.

This varnish must be applied while the negative is quite cold, otherwise it will dry with a gloss. It is very inflammable, and must not be used near a fire or lamp. It must be poured on in a pool, and the negative tilted to induce it to flow evenly all over the surface; the surplus is then to be poured back into the bottle.

In five minutes it will be sufficiently set to be worked upon with powdered black lead, applied with the stump or a tip of the finger. Care must be taken to not apply too much, otherwise it will cause an unpleasant patchy appearance on prints from the negative.

Minute transparent spots, due to dust, should be carefully removed by filling them with a mixture of water colors. The usual colors are Prussian blue and crimson lake or carmine, and with these any negative film can be satisfactorily spotted.

A fine-pointed sable pencil must be used, and it should be fully charged with color. The negative should be placed as nearly flat as possible (while still permitting light to pass through it) and the color applied with one light touch of the extreme light point of the pencil. Avoid more than just lightly touching the centre of the spot, or the color will extend to the surrounding film, causing an unsightly blemish, which will have to be washed away.

All water-color spotting should be done previous to lead-pencil work, so that in case of accidents the spotting may be removed and done over again without waste of time and energy.—*Amateur Photographer.*

New Silver Compound.—The claim is for a new solid silver compound which is not precipitated either by albumen or by salt, and which is prepared by mixing ten parts of the neutral sodium salt of casein with one part of silver nitrate, the whole being then dissolved in water by the aid of heat. The solution is precipitated with alcohol, and the precipitate dried, or the solution can be evaporated to dryness in vacuo.

PHOTOGRAPHY AND REFORM.

When Burns wrote,

> "O, wad some power the giftie gie us
> To see oursel's as ithers see us,"

says the Brooklyn *Times* he no doubt had in mind other than a superficial application of the principle and probably had little idea of its use in connection with the modern art of photography. We may not ascribe to photography the power referred to, except in so far as we give to the couplet a strictly literal interpretation. It is not the purpose of the *Times*, however, to enter into any finely drawn discussion, but merely to call attention to a recent occurence which suggests that the use of the quotation may be both apt and forcible.

The AMERICAN JOURNAL OF PHOTOGRAPHY publishes the following :

A woman in Salemville, Pa., determined that her husband should know how he looked when he was drunk. She knew how he looked well enough, and needed not that any man should tell her Her children also knew by sad experience, but the man himself had a very imperfect idea of the state of his case. So once when he came home and fell into a maudlin slumber she sent for a photographer to come forthwith, and on his arrival she set before him his work. She ordered the photographer to photograph her husband as he sat in the chair. The photographer did his work and did it well; and when the photograph was finished and laid beside the husband's plate at breakfast it was a revelation, and the sobered gentleman experienced a decidedly new sensation. There was no need of explanation, the thing explained itself. There was no chance for contradiction ; the sun tells no lies. There was no room for argument ; a reform has taken place.

Here is a new use for the camera. A decidedly novel and worthy suggestion is embodied in this idea of the Salemville wife. The *Times* will not say that an unqualified application of this method would be likely to bring about a sweeping reform movement, but it has in it that which should merit consideration. Neither would it show a proper appreciation of the diversity in

human temperament to intimate that the result of each application of this method would be the same as in the above case.

Someone who has taken the trouble to look into the matter has said that when a Frenchman is intoxicated he wants to dance, a German to sing, a Spaniard to gamble, an Englishman to eat, an Italian to boast, an Irishman to fight and an American to make a speech. This may be regarded as a general specification which might be amplified by a reference to individual characteristics or peculiarities. Different men are, of course, affected differently by an over-indulgence in strong drinks. But it has often been asserted that if a certain class of men could see themselves as others see them under the influence of liquor, they would never be likely to get in the condition again. The husband referred to in the above seems to have been of this class.

Whether this little story is true or not, the value of the suggestion remains. The idea of this humble, unknown wife is a happy one, and the *Times* commends this gentle means to a worthy end, as more likely to win success than many more forcible and vindictive methods.

A writer in *Nature* makes a point that cannot fail to interest even if it does not convince some of the small fry scientists who have been riding Roentgen rays to death. The article is as follows: "A habit has been growing of recent years among certain scientific men, which many of those with whom I have discussed the subject join with me in regretting. It is this: 'After the announcement of an interesting discovery a number of persons at once proceed to make further experiments, and to publish their retults. To me it appears fair and courteous, before publication, to request the permission of the original discoverer, who probably has not merely thought of making identical experiments, but who has in many instances made them already, and has deferred publication until some grounds exist for definite conclusions." This suggestion is certainly a wise one. We have heard of late all sorts of claims as to this or that fact disproving Roentgen's discovery or in some way modifying it, and, moreover, in some cases the experiments have been made by men who confessedly have just taken the matter in hand, while the German professor's work represents the study of many years. Give the discoverer a show.

THE USE OF ALKALIES.

ALKALIES will probably continue to grow in importance to the photographer, as alkaline developers are already used for, practically speaking, all negatives, most lantern slides, and a very large proportion of bromide prints. The supposed advantages of ferrous oxalate for negative work are now very rarely heard of, and the fact that it is still used for positive work is due, we think, rather to custom and prejudice than to any real gain that it offers.

The alkalies at the disposal of the photographer are caustic potash, soda, and ammonia, and their carbonates. It is customary and advantageous to discuss the merits of these substances chiefly on two lines, namely, as to the relationship between the fixed alkalies and ammonia in the first place, and between caustic potash or soda and their carbonates in the second place. Ammonia seems to be particularly pliable in the hands of an experienced worker, giving him greater scope in the production of varying results. We believe that it is so in our own practice, though it is difficult to say how much imagination has to do with the opinion. Still, we have long since quite given up its use except for lantern slides, considering that this advantage, if it really exists, is more than outweighed by its undesirable qualities. The first of these is the fact that it exerts a solvent action on the silver bromide, and on theoretical and practical grounds we object to dissolve any of the silver compounds during development. When dissolved they are sure to get reduced by the developer, and the metallic silver thus formed will deposit upon any part of the plate that has been made sensitive to such staining influences, as by deterioration through age, etc., sometimes giving a color fog, or where there is no tendency to such irregular deposit, the silver will probably add itself to the image, giving greater density than can be obtained with the fixed alkalies. But such an increase cannot be well controlled in quantity, and introduces uncertainty as to the gradation. It does not appear that the effect

of intensification of this character has yet been investigated, and it is most probable that it will be found to be irregular.

As to the choice betwen caustic potash or soda and their carbonates, we have no hesitation whatever in preferring the latter.

The caustic alkalies can neither be obtained, or kept when obtained, in a pure condition, without such care as it is impossible to bestow in a photographic laboratory, and their caustic nature renders them very unpleasant. On the other hand, the advantage resulting from their use is difficult to discover. Hydroquinone appears to require caustic alkali when used for halftone subjects, but it is not necessay to use hydroquinone. The uncertain nature of the degree of purity of the caustic alkalies, and the impossibility of keeping the solutions of them in a uniform condition, put them on a par with ammonia, in the using of which the operator has to feel his way. When developers are prepared by the manufacturers many gallons at a time, then the uncertainty is or may be very largely eliminated and the disadvantages of the caustic alkalies are reduced to a minimum. And although caustic alkali is used in the preparation of "rodinal" the alkali is not in the caustic condition in the prepared solution. But for the photographer's own use the balance of advantages points unmistakably, in our opinion, to the use of sodium carbonate in almost every case when an alkali is required.

It is natural to suppose that substances and preparations are likely to deteriorate by age. Many things lose their "virtue" or "strength," as it is commonly expressed, and this notion is extended to almost everything, unless definite knowledge exists to the contrary. Crystallized carbonate of soda, the commercial "soda" or "washing soda," is an exception to this rule. Unless it is securely kept it loses water, so that an old sample will probably contain less water of crystallization, and therefore, weight for weight more of the alkali. All other alkalies that the photographer is likely to have to deal with change by keeping or exposure in the opposite direction. The caustic alkalies absorb water and carbonic acid with avidity, both crystallized and dry potassium carbonate readily absorb moisture, and so does dry (that is, chemically dry, or freed from its water of crystallization)

sodium carbonate, Ammonia obviously loses gaseous ammonia rapidly, or it (that is, the ordinary solution) would not have so strong an odor. Carbonate of soda is of all alkalies the most easy to obtain in a uniform and known condition. The crystals known commercially as pure may be assumed to contain the normal amount of water of crystallization, namely, about sixty-three per cent., so long as they remain transparent. The best way to get an exact proportion of this salt is to purchase it in the anhydrous form, and to heat it to a temperature of about 200° C., or something short of a red heat, for a few minutes to get rid of the small quantity of water that it always contains. Of this anhydrous salt less must be taken than of the crystals in the proportion of one hundred to thirty-seven. But the refinement of the exactness obtained by the careful use of the anhydrous carbonate is never necessary in ordinary photographic practice.

In caustic soda, the best is not always the most expensive, or the whitest or the freest from insoluble matter. Indeed, for equal strengths or purities, that which has the most insoluble matter is the best, because it leaves the largest proportion of its extraneous matter behind when dissolved for use. There is no method by which the photographer who is not also a chemist (we do not mean a pharmacist) can ascertain the proportion of caustic alkali present in a sample. A good sample might lead to foggy and thin negatives, because it is probable that most formulæ refer to stuff that does not contain much more than four-fifths of the real alkali. So that the quality cannot be determined by trying a plate with it.

In changing from one alkali to another the photographer naturally wants to know their equivalent quantities, how much of the one he must take to get a similar effect to the amount used of the other. This is a question that cannot be answered, in spite of the fact that tables have been published which are supposed to set forth the equivalents. It is easy to give the equivalents of acid neutralizing power, but this has not yet been shown to have any connection with developing power. But if such equivalents were known, the ordinary photographer could not use them except in the most roughly approximate manner, be-

cause his caustic alkalies would never be pure, and they would be continually deteriorating, especially when in solution. In replacing one alkali by another, therefore, there is nothing for it but to try and try again until a suitable quantity is found. As to the choice of an alkali for general use, we have already recommended carbonate of sodium; and if this is bought of fair quality, not the cheapest—"washing soda"—kept carefully bottled up, and not used after it has become powdery and opaque, the photographer may, without special precaution, be sure of having solutions of the same strength from time to time.

—C. J. in *Photography*.

To Preserve Flowers with Natural Form and Color.—Professor Pfitzer in the *Journal of the Austrian Pharmaceutical Society* gives the following method for preserving flowers so that they retain their natural color and shape. We quote an abstract from *The National Druggist*: "Moisten 1,000 parts of fine white sand, that has been previously well washed and thoroughly dried and sifted, with a solution consisting of 3 parts of stearin, 3 parts of paraffin, 3 parts of salicylic acid, and 100 parts of alcohol. Work the sand up thoroughly, so that every grain of it is impregnated with the mixture, and then spread it out and let it become perfectly dry. To use, place the flowers in a suitable box, the bottom of which has been covered with a portion of the prepared sand, and then dust the latter over them until all the interstices have been completely filled with it. Close the box lightly, and put in a place where it can be maintained at a temperature of from 30° to 40° C. for two or three days. At the expiration of this time remove the box and let the sand escape. The flowers can then be put into suitable receptacles or glass cases without fear of deterioration. Flowers that have become wilted or withered before preparation should have their color freshened up by dipping into a suitable aniline solution."

Try to do to others as you would have them do to you, and do not be discouraged if they fail sometimes. It is much better that they should fail in obeying the greatest rule laid down by our Saviour than that you should.—*Charles Dickens.*

Photographic Scissors and Paste.

Miles of Photographs.—A readable description of the automatic printing process.—One hundred thousand photographs of actors, actresses and celebrities every day, is the record forced by the tobacco manufacturers who give away such things to purchasers. For a limited time one company alone had a demand for 400,000 pictures daily. At another time recently the representative of a large tobacco concern went to a photographer of this city and desired to place an order for 1,000,000 cabinets to be delivered in six months. The man who says "Now look pleasant," simply threw up his hands helplessly, and said that he could not possibly print so many photographs in that time were the sun to shine every day and for twenty-four hours at a stretch. He confessed, says the New York *Sun*, that he found his limit from one negative to be from ten to twelve prints a day; also that, increase his negatives as he might, and spread his printing frames on every roof in his neighborhood as he might, he would still be simply paralyzed when it came to fixing, toning, washing and mounting. And the picture-hungry man went to a place near by, where he could fill his order in ten days, where they print, develop, fix, wash, dry, and mount pictures by the mile—where, in fact, they run them out by machinery at the rate of 100,000 a day on a pinch, and produce between 60,000 and 70,000 daily, all packed, regularly.

It is a marvel of modern photography. It is, as compared with the hand process, what the great latter day inset printing-presses are to the old Washington hand presses, and it works not so very differently, for a great roll of sensitized paper, more than 3,000 feet in length and three feet wide, goes into one end of the apparatus untouched, and comes out at the other end in the form of large, dry sheets of finished photographs. All this is managed with the utmost mechanical precision, and every picture is perfect when it emerges.

The process is a new one. Of course, it acquires its value from the constantly increasing demand for immense numbers of photographs. Six or seven negatives of the regulation sort are placed in a frame, side by side, and the string of them thus formed is placed in the printing machine. A roll of bromide paper, prepared with a quick acting emulsion, is suspended or pivoted at one end of the machine, and the end of the paper is started through. In the half-cylindrical exposure-box containing the negatives an immense light is produced by means

of eight incandescent electric lamps. When it is all in readiness a platen below presses the paper up against the negatives, the light is turned on, and an exposure of one or two seconds is made. Instantly the lamps go out, the paper is pulled along by a winding-up device, and the operation is repeated. When one or more of the negatives are less intense than their fellows, and the ordinary exposure is found to be too long, thin sheets of waxed or tissue paper are pasted over to filter the light rays, and render them less active.

The roll of paper, upon which nothing appears, the impression being all latent, is now carried to the developing, fixing, and washing tank, where it is again suspended and unwound as the process goes forward. The first compartment of the tank is provided with a developing solution, the next with water. Then come hyposulphide of soda (fixative), water alum, and more washing, until finally the broad ribbon goes into the drying box, hot-air heated, upon which it travels to the top floor, to be cut into sheets for easy handling. All the tanks are provided with sets of rollers, both at the top and bottom, and, as the tanks are three or four feet deep, the strip remains in each solution for several minutes, although it travels at the rate of about ten feet a minute. The process, so easily watched, is most remarkable. The lamp over the roll and developer tank are red or non-actinic, and under their glow the white paper enters the fluid over the first roller. When next it appears, to dive again, the half-developed faces show dimly, and at the next emerging are strong, clear, and wonderfully uniform. Down, after a washing, goes the band into the "hypo," to come up cleared, and when at last the washed and alumed pictures go up the drying chute they are things of beauty and perpatual joy.

The possibilities of this automatic process are almost incalculable. It would be comparatively easy to take a flash-light photograph of the largest audience that ever assembled in any theatre in this city at nine o'clock, and then to hand every one a finished picture as he or she went out at the door when the play was over. In the case of the Defender-Valkyrie races a company could have placed at least 100,000 moknted photographs of the finish on the streets next day. It would easily be possible to produce 250,000 pictures every day. Of the large panel pictures the apparatus would turn out 25,000 as a fair daily average. From any one single negative 20,000 finished cabinet photographs could be furnished each day, as against the twelve produced by the ordinary method.

Never let a scrap of old black silk get away. It is sure to come in useful some time.

"How to test a lens" has been the subject of much controversy, but all agree that the best and simplest test is a perfectly plane surface of white in which sharply defined black lines are traced at right angles to each other.

Such a test surface will bring out in strong relief all the weak points of a lens.

If it lack flatness of field the definition will decrease rapidly from the center; if not rectilinear, the parallel lines of the test will converge toward the margin of the field; if astigmatism is present, the horizontal lines will be sharply in focus while those drawn vertically will appear duller and indistinct at the edge, and vice versa.

There may be some sorts of work which could tolerate one or the other of these errors, but surely there is none which will be improved by their presence; in fact, every sort of photography is benefited by, and improved directly in proposition to, the optical qualities of the lenses used.

Witness the possibilities in architectural, landscape, mechanical, group and instantaneous photography since the introduction of the Anastigmat type of lenses. In order to permit a fair estimation of the qualities of lenses and to furnish an accurate basis for comparison, the Bausch & Lomb Optical Company have issued a test chart which accompanies each of their Zeiss Anastigmat lenses.

They have also added a new series of Anastigmats to the list, which surpass any of the achievements of the "Anastigmatists."

The new lenses are "convertible," that is, each doublet is composed of two single Anastigmats. The single Anastigmat is in turn composed of four lenses so combined that the errors of one correct those of another, rendering the system entirely free from the errors common to single lenses when the elements are limited to two or three.

It will thus be seen that each single Anastigmat can be used by itself being a perfectly corrected lens.

Two single Anastigmats of dissimilar foci may be combined, forming an extremely rapid doublet lens, possessing covering capacity and definition of the very highest order, as would be expected from the perfection of the two systems composing it. When tested on the chart, this lens shows a perfectly defined field, entirely free from marginal distortion, even with the full opening, up to the limit of the image circle.

Each of the single systems is useful for landscape, group, portrait and instantaneous work, not requiring a greater speed than F- 12.5, thus in reality making one lense the equivalent of three.

The lens mount has a revolvable ring engraved with the value of each of the single systems and of the combined systems. By a slight rotation each scale is brought into position for use and is held there by a stop. The convertible Anastigmats are all so constructed as to admit the fitting of a shutter between the lenses.

Magnesium Lighting.—It has been suggested that the permanency of magnesium wire under oxidizing influences would be considerably increased if the material were drawn down from a compound ingot having a core of magnesium enclosed within a relatively thin hollow cylinder of aluminium. The result would be a wholly combustible wire or ribbon having a thin outer shell of protective material, permanent in cold air, and a relatively thick central core of the more easily oxidizable metal. Of course, there are many other metals that could be applied in this way, or by electro-deposition, in place of the aluminium. And, similarly, the fine magnesium powder might receive by electro-chemical action a protective coating, just as a coating of some metal is often given to the powdered plumbago that is employed in electrotypy. Essentially a similar idea was involved in the invention of magnesium "matches," as we described it some little time since. In other words, the coating for the surface protection of the magnesium might be a coating of paraffin-wax or spirit-varnish, or any other combustible and impervious matter. Again, the suggestion raises a general question of the utility of magnesium *alloys* for lighting purposes. We may secure the combustion of less easily oxidized metals by "sandwiching" them with magnesium, and we also may protect the magnesium against too ready oxidation by alloying it with such more permanent metals; or on the other hand we may protect *more* readily oxidized metals by incorporating them with the magnesium. An instance of this last course (by no means a useful one, however, from the photographer's point of view) is afforded by some commercial magnesium, in which traces of free sodium may be found. To return to the "protected" magnesium wire. This form might be specially useful in cases where an exceedingly fine filament is requisite. One cannot but be struck by the fact that in such a lamp very fine combustible wire would give almost the nearest possible approach to the much desiderated *radiant point*. For the realization of an exceedingly small point of light at the end of the wire, what is needed is a considerable reduction in the diameter of that material, and a corresponding increase in the rate of feed. Where, conversely, the points of light should be splayed out as far as possible, something might be done by compound-

ing the magnesium wire of a number of separate filaments, each having a twist such as is given to the wicks of candles for the purpose of determining a lateral light.—*The Optician.*

Color Printing.—A process of color printing that is better than chromo-lithography, which costs less than one-third as much, and which may be used on an ordinary steam press at the rate of eight or ten thousand a day, according to the New York *Herald* is now claimed by Isaac D. Blanchard, of this city, as the result of years of experiment. Mr. Blanchard, it is stated, began to study the subject some time ago, taking it up where others had left it, spending thousands of dollars in experiments, and working always with a view to the uses of the process in printing. This new process is based upon an ordinary negative. From this three duplicates are made, each one representing the union of all the colors. But it was very easy to do by hand what in the old way had been done by the camera—namely, to take from each negative all but one color. From one was painted out all but that which in the original was yellow; from the next was taken all but the red, and from the third all but the blue. The fourth negative was left untouched, and consequently represented all the colors. Now, all these negatives being just alike, they fitted perfectly one over the other, or in the printer's term "registered." From each one was prepared a relief plate for half tone work, in the ordinary way, by photographing through a screen. This gave a metal plate on which appeared a reproduction of only that part of the original which was red or yellow or blue, according to the negative from which it was made. A fourth plate was then made to carry the neutral tint—a simple gray, which is either light or dark, according to the amount of "impressson" the printer puts on. By four successive printings, one from each of the four metal plates, one over the other, every shade of the solar spectrum can be produced, and behold! the thing is done; the problem is solved. This invention is so new that no one seems to have named it yet. Color-half-tone would be the most accurate and descriptive. But whatever it be called, it is bound to do for chromo-lithography what the invention and the perfection of the half-tone process of illustration has done for wood engraving.

A New Engraving Process for Newspaper Work.—A new engraving process, from which it is expected that cuts for newspapers will be made to resemble steel engravings, has been devised by a New York photographer, according to the Boston *Journal of Commerce*,

December 28th. It is claimed that by the use of the "compound negative" pictures can be produced with the fine effects of steel engraving and with the economy of the ordinary half tone. Different parts of the picture may also be made to have different effects; thus a face may be brought out in steeple, while a dress may have a line effect, and the background be a mass of cross hatching, in which all the lights and shades of a halftone are given. An ordinary dry plate is made into a negative, bearing the lines of dots intended for use in the finished picture, the object photographed being an engraved or etched plate of steel or copper. From this negative a print is made on a specially prepared gelatinized and sensitized paper made by the inventor. An ordinary portrait negative is then made and coated with an emulsion of turpentine and resin, which is allowed to dry. After drying it is immersed in cold water, and the special print pressed against it, film side down on the film side of the negative, optical contact being assured by pressure under a "squeegee." In a few minutes the printed film sets and unites with that of the portrait negative. They are then placed in water, heated to a moderate temperature, when the paper print becomes loose and may be drawn off. The double film negative is now subjected to a washing, which removes all the gelatine in the stripped film, leaving only the part acted upon by the light, and thus forming a compound negative composed of reticulated, translucent, gelatinous coating, containing lines, dots and stipples, as in the original negative, to which such coating is intimately secured. From the compound negative pictures are printed in the usual way, and show all the fineness of a steel engraving. To have the picture contain a variety of engraving lines the film is attached in sections to the negative, having been first produced in the manner described from original plates. The work of fitting plates for submission to the stereotyping process in use on daily papers is a little different, though the principle is the same. The greatest difficulty which can possibly be overcome is the short time allowed by the exigencies of newspaper work. The reticulated film is fixed on a plate of zinc, instead of a photographic negative, and is made after a different formula, in order to withstand the action of acids used to etch out the lights of newspaper pictures. The plate, after etching, shows the fine work of an engraving. The process marks a distinct advance in the method of producing fine photographs, and may be utilized by the press to increase the artistic effect of illustrations.

Employment of Gas Lighting in Photography.—This paper, as its title implies, deals with the various kinds of burners both for

printing and portraitnre. Two years ago experiments made at the Berlin Charlottenburg Polytechnic School showed that it was possible to obtain satisfactory prints on gelatino-chloride paper with an exposure of twenty minutes or more at a distance of 15 c.m. from an Auër burner followed by development, while platinotype papers require under similar conditions from three to five and a half hours. More recently with collodio-chloride paper exposed at the same distance satisfactory prints have been made in from four and a half to six hours for toning and fixing without development, while with less sensitive papers such as the ordinary albumenized paper of commerce, an exposure of seven hours was required. The rise in temperature which the proximity to such a burner effects in the negative and paper, so far from having a deleterious effect, increases the sensitiveness of the latter. Other burners have not been found so satisfactory. Vogel and Wedding examined the light emitted from an Auër burner, and from a Stobwasser burner. The former with a pressure of gas of 5 m.m. and consuming 156·51 liters per hour, gave a light of 70 candles, the latter with the same pressure consumed 127·05 liters and gave a light of 52·26 candles. Experiments have been made in the employment of acetyline as the source of light in portraiture, and MM. Bispnick and Peck exhibited in Amsterdam apparatus for the purpose consisting of a gasometer and an arrangement of twenty burners. The author suggests the use of acetyline has been retarded by its poisonous properties, and points out that the researches of Hempel show that not only are these much less than in the case of carbon monoxide, but are less than those of ordinary house gas. Acetyline is likely to be greatly employed in the future on account of the great photographic activity of the light, which is nineteen times as great as that of coal gas burnt in an ordinary burner, and 4·5 times as great when the coal gas is burnt in an Auër burner. In order to produce a given intensity of light per hour, six decalitres of acetyline take the place of

27 decalitres with a new pattern Auër burner.
54 " " an old pattern Auër burner.
100 " " an Argand burner.
115 " " an ordinary burner.

—*Bulletin Photographic Club.*

Solarization.—Over exposed plates which with ordinary developers would give a positive instead of a negative, will when treated with a vanadium or molybdenum suboxide salt, yield a negative which, however, differs very materially from ordinary negatives, and which the author suggests is probably free from metallic silver. The

paper deals with reversal, other than that caused by excessive exposure, and the author proposes to style such reversal "pseudo-solarization." A simple example of this is to be found in plates light fogged while lying in the developing dish. Another case is that in which a soluble silver salt is either present in the plate at the outset or is produced during development, as for example if hypo is added to a ferrous oxalate developer or when the developer itself contains solvents of the silver salt such as ammonia. In this case the soluble silver salt is attacked by the developer and reduction may become greater in the parts unexposed to light than in those exposed, but in such cases the silver deposit is red and not black. An under exposed chloride plate containing excess of nitrate of silver was developed in ferrous oxalate for a long time. At first the result was normal, that is, negative, but in about an hour the plate began to reverse, and after several hours the deposit was an intense brown all over. By transmitted light it had the appearance of a vigorous brown positive, although the original negative had not been lost but was still perceptible. A similar experience was obtained by developing the under exposed chloride plate with the pyro-soda for some hours. Bromide plates developed with pyro which contains hypo may yield such red positives.

Why this red deposit of silver takes place so much more strongly in the unexposed than in the exposed portions is thus accounted for by the author. The soluble silver salt from which the silver is reduced is formed from the silver haloid in the film. In the exposed portions this has already been reduced to the black silver deposit, and consequently less of the soluble silver salt can be formed in the exposed than in the unexposed portions. The positive image may be partly removed by rubbing, since the soluble silver salt on account of its solubility can ooze out of the film and part of the reduction takes place on the surface. Ammonia acts exactly like hypo. Kagelmann some time ago pointed out that metol with ammonia yielded a positive result, but that this positive was actually a hybrid, being composed of a very faint negative deposit together with a more intense positive layer. There are consequently no clear whites. In the negative image the reduced silver is of the usual gray color. The positive is violet by transmitted and yellowish gray by reflected light. Amidol with ammonia yields a very similar result, and in all these cases of pseudo-solarization the negative image is to be found as well as the positive.

—R. Ed. Liesegang, in Photo Corr.

A Great Scheme.—According to the New York *Evening Sun*, a Chicago publishing house has decided to bring out the following books:

1. The works of Robert Browning, in six volumes, with a guide book and map, together with a compass and sextant, and a divining rod of English hazel, warranted for use, in finding the Where-at-ness of the Is in disputed passages, fifty copies, octave, crushed strawberry, lubricated title page, $10.

Also, twenty-five copies on large, hand-made Dutch grocery paper, with signature in the author's fist, $200.

Also, edition de luxe of Sordello and Bromo-Selsus, with flashlight apparatus, for finding out whether Sordello was "man, city or book," limited to five copies, $1,000.

2. The works of Ralph Well-to-do Emerson, with a cryptogram, giving a straight tip as to what he meant, with side lights on the Over-soul, boards, hard, $50.

3. Mark Twain's "Roughing It," fifty copies, on sandpaper, in press.

4. Lewis Morris' "Ipecac in Hades," with designs by Augustiner Beersley, $7.50.

5. Bryce's "History of American Commonstealth," edited by Inspector Byrnes, with Side Door Remarks by Theodore Roosevelt.

6. The works of John Ruskin, including "Ethics of the Mud," "Crown of Wild Carrots," and "Belgian Blocks of Venice," finely printed on white samite, wonderful, $250.

Also, special edition of "Modern Painters," giving full directions for Painting the Town in Tints Carnation and Cerulean, bound in cheviots, farmer's satin lining, $500.

7. Kipling—"The Light That Failed," with a treatise on the Treachery of the Arc Lamp, asbestos covers, $2.50.

8. Poems of William Dean Howells—uncut, warranted to remain so. Being a Modern Instance of how April Hopes may be blasted by A Chance Acquaintance. Published as an Imperative Duty. Copy given free to every lady accompanied by a gentleman.

9. "Within the Wheezy Briar Pipe," by Ian McLaren, $1.25.

10. Problem Plays of Pinero and Henry Arthur Jones, including the Uproarious Mrs. Ebb-tide" and "Mickey and His Lost Reputation," plays illustrative of movement, with full plan of theatre exits.

11. The Poems of Alfred Austin and Poet Laureate of England, including all his finer frenzies before he got there, and all the mush he has written since. At your own price.

Photographic Hints and Formulæ.

Copying Ink.—A writer in a recent issue of a French scientific paper gives the following formula for the manufacture of a copying ink, by means of which a number of excellent copies can, he says, be obtained without the aid of a copying press:

Logwood extract	28 grammes.
Soda crystals	3½ "
Chromate of lead (neutral)	1 "
Gum acacia	3½ "
Glycerin	28 "
Distilled water	A sufficient quantity.

The logwood extract, in the form of a coarse powder, is to be put into a porcelain vessel with the soda, then add 230 grammes (1000 grammes equals 1 kilo., about 1¼ pounds English), and boil until the extract is dissolved and the solution has a reddish tint. Then take it off the fire, add the glycerin, and then the chromate and the gum, which can be dissolved in a little water.

Photo-micrography.—This paper, which was read before the Odontological Society of Great Britain, gives a sketch of progress in photo-micrographic work. After referring to the results obtained by various workers, and to the use of apochaomatic objectives, the writer advocates an oil lamp with a large flat wick, the edge of which is turned towards the object, a form of illumination which has answered in his hands better than the round wick employed by Dr. Neuhaus. For sunlight, lime or the electric light Zetnow's light filter is advocated, consisting of:

Copper nitrate	2½ ounces.
Chromic acid	2 drams.
Water	4½ ounces.

—*British Journal of Dental Science.*

Dr. Max Wolf's method of detecting minor planets by photography is described in a recent number of *Nature*. He uses a six-inch portrait lens of thirty inches focal length in his telescope, which gives him a field of about seventy square degrees. To make sure that the trails of the planets are not defects in the plates, two photographs of

each region are taken, with an exposure of two hours. A positive and a negative are put together with the films in contact where the trails appear as a continuation of each other. Another method is to look at the photograph through a stereoscope, the planet then appearing in relief. Dr. Wolf has never looked through the telescope at any of the many planets he has discovered by the photographic method.

[COMMUNICATED.]

How to Prepare Ammonia Nitrate of Silver.—The first drop of ammonia added to a neutral solution of silver nitrate produces no precipitate, but renders the liquid strongly alkaline, without, however, imparting to it the odor of ammonia. If ammonia be added to silver of any strength it becomes ammonia nitrate of silver from the first added drops till the silver is precipitated, and re-dissolved in the precipitant on the addition or nitric acid from a small portion to a large portion only varies the tone you wish to obtain to the print. The least amount added will giveyou pure blacks. For instance, if you take fifty grains of silver to the ounce of water, when dissolved pour off one-third and to the two-thirds left add strong liquid ammonia till just dissolved from the precipitate, then add the one-third, it will form another deep oxide of silver. When this has settled, pour off from the oxide, then silver with clear solution; this will give you pure blacks. But if you add nitric acid to the oxide that you had poured from till it is barely taken up, the print will be good, but of a brown-black tone, so you can grade the silver to any tone you want. Prior to 1856 I don't find ammonia nitrate of silver mentioned in any work I have, though I have a work published by George Thomas Fisher, Jr., on photography, where he mentions bromide paper. The date of the work is 1845. JOHN CLEMMONS.

"What's this?" asked Marie, looking at the blank piece of cardboard which Wilbur handed her. "That's Chollie Dudekin's picture by the Roentgen process." "But I don't see anything." "That's just it. This Roentgen light method takes interiors. Barring his exterior, there isn't anything to Chollie to take."

The Editorial Dropshutter.

The Camera as a Reformer.—What a factor the camera and sensitive dry plate can become in the interests of law and order has been frequently noted in the various papers. One of the latest instances of this kind to come to the public notice was a series of snap-shots taken in the interest of an honest ballot in the slum district of Philadelphia during the last municipal election. Some fifty or sixty snap shots were taken in front of various polling booths. Some of these pictures show how active the police were in influencing voters, an act which, according to the statute, is illegal. Others again show a number of the same fraudulent voters entering different polling places. The evidence in the interest of an honest election furnished here by the camera was uncontrovertible, and resulted in the seating of the honest candidate.

The New Photography.—The March number of the *Montreal Medical Journal* contains an article on the new method of photography, illustrated with half-tone photo-engraving of the experiments at McGill Medical College by Prof. Cox. These appear to have been the most successful on this continent. One of the photographs clearly showed the location of a bullet in the leg of the patient operated on, and enabled the surgeon to quickly extract the foreign substance. They will be reproduced in the *Journal,* which will also contain a plate illustrating the procedure by which the result was obtained. As medical men are paying much attention to the development of the new discovery, there will be a good deal of interest in the article in question.

Professor John Joly, of Trinity College, Dublin, the discoverer of the Joly method of photographing in colors directly from nature, is paying a brief visit to this country. His method consists simply in the use while taking the picture of a screen ruled minutely in the three primary colors, and in the use of a similarly ruled screen of slightly different shades in printing. So far the method has been used only in transparencies.

Revealed by Photography.—Indianapolis, Ind.—John Lehman died here some weeks ago, and upon the records in the Recorder's office was found an unsatisfied mortgage, given by Mark C. Davis, ex Treasurer of the Iron Hall, for $1600. Lehman had lived with Davis until he was removed to the infirmary, and his trunk and other chattels

were in Davis's possession. When the administrator made a demand for payment of the mortgage Davis said he had paid it, and produced a note and also a receipt, the latter being for interest, with the last clause reading, "and $1600 principal due on said note." The administrator did not believe the note had been paid, and suit was brought to collect it. The receipts and note were presented, and the attorneys for the administrator demanded that the receipt be photographed, that they might examine it. This was done, and they came into court with a sensation, the photograph and expert testimony showing the latter clause, which receipted for the principal, was written in a different ink from the body of the receipt. Experts testified that the receipt had evidently been folded and carried for some time, as the paper was so worn that ink penetrated the fibre of paper when the additional sentence was made. The developments in the case created a sensation in the court-room, and Davis was evidently much disconcerted.

A Clever Amateur. — Some weeks ago the editor of *Harper's Round Table*, the well-known youth's weekly, instituted a competition for amateur photographers. The competition was divided into senior and junior classes, the latter composed of regular sir knights of the Round Table; the former being older persons who were amateurs. The editor says that among all the competitions of this kind which the paper has held in former years, none was so prolific in such fine pictures, and never were so many pictures submitted. The first prize in the senior class figure studies was won by H. E. Murdock, a well-known member of the Minneapolis Camera Club, who has taken high rank among the amateur photographers of the city. His picture represents a young woman standing in evening attire, with a watch in her hand. "He Cometh Not," is the title of the subject. The editor of the *Round Table* says of the picture:

The first prize in figure studies was awarded to one entitled "He Cometh Not." A young lady in evening costume, with opera cloak and scarf, sits holding a watch at which she is looking, evidently much annoyed at the non appearance of her promised escort. The subject, though rather a hackneyed one, is well treated, the lighting, pose and expression being above the average of photographic work. The mounting and finish of the picture are also very fine.

Mr. Murdock received as the first prize for his picture, in addition to the honor of winning, the sum of $25.

California Camera Club.—The annual print exhibition of the club was held in the Academy of Sciences building, March 24–28.

Photographic Literature.

Die Chromolithographie. Von Frederick Hesse. Wilhelm Knapp, Halle, a. S.

A new text-book on above subject, to be published by the well-known publishing house at Halle, Germany. It will be issued in ten parts, and contain fifteen chromo-lithographic plates, and eighty-two illustrations in the text. The subject is one of interest to every one interested in the graphic arts, as it is only by the chromo-lithographic process in connection with photographic aid that we can obtain absolute fac-simile reproductions of paintings and colored objects, and numerous similar subjects where absolute fidelity to the original is required. The author of the work, Herr Hesse, has for the past eight years occupied a responsible position at the imperial establishment at Vienna, and is well fitted for his task, the whole work being a result of practical experience.

Photographic Printing Methods. W. H. Burbank. No. 22 of the Scovill Photographic Series. Fourth edition. The Scovill & Adams Co., of New York.

This work, so well known to the photographic students throughout the country, has now reached its fourth edition, and well deserves its popularity. It is a practical guide to the professional and amateur worker, and should be within easy reach in the gallery or laboratory, no matter how large or small.

Photographic Surveying, including the Elements of Descriptive Geometry and Perspective. By E. Deville, Surveyor General of Dominion Lands. Ottawa: Government Printing Bureau, 1895. A second and enlarged edition of this exhaustive work on photogrammetry.

It appears that in this matter of photographic surveys the Dominion of Canada stands far in advance of other countries. The book also explains in a concise form the principles of descriptive geometry and perspective, keeping in view the special purpose of application to perspective surveying. The principles of and mode of action of photographic lenses is also explained, as are also the various instruments.

Not the least interesting is the reference to secret or balloon surveying. The book is fully illustrated with numerous diagrams and full-page illustrations.

Instantaneous Photography. By Captain Abney. Scovil & Adams Company, of New York, 1896.

The contents of this valuable and instructive chapter is really a reprint of a series of articles by the gifted author on instantaneous photography which were published in *Photographic Work* some time ago. These papers are now available in a permanent form, and a copy should be in the hands of every one who is interested in instantaneous photography, whether ordinary hand camera work or scientific research and artistic studies. The book is printed by Carter & Company, London, and is fully illustrated.

Photographischer Notiz Kalender, for the year 1896. Published by Dr. F. Stolze, with suggestions by Dr. A. Miethe. Wilhelm Knapp, Halle, a. S.

A concise book of ready reference and pocket memorandum book for the German photographer or photographic tourist. It contains, amongst other information, a railway map of Germany, together with a series of tables and formulas for any and every emergency. There is also a diary for daily entries, with full information as to postal and telegraph laws and procedure, also a complete list of German photographic societies.

Encyklopaedie der Photographie. Wilhelm Knapp, Halle, a. S. 1896.

The two latest numbers of this exhaustive work have been received. No. 18, "The Silver Image upon Salted Paper," by Arthur Freiherr von Hubl. This work is divided into two parts. The first treats upon the theoretical and experimental phases of the process, while the second part is devoted entirely to the practical manipulation of what may be termed the oldest photographic process, the object of the writer being mainly to show how effects may easily be produced equally, if not surpassing platinotype and similar effects.

No. 19, "The Application of Photography to Military Purposes," by Kiesling Premier Lieutenant, a. D. Ewhellenhe, with twenty-one illustrations in the text. The work explains in detail every application of photography to military purposes, prominent among which are the reproduction of maps, plans, etc. Photogrammetrie, balloon, kite and rocket photography. Tele-photography, recognisance by aid of the camera, also experimental exposures on projectiles, gun recoil and explosion of mines and shells.

Too much credit cannot be given to the great publishing house of

Wilhelm Knapp, at Halle, Germany, for the liberality and care they are expending upon the publication of this great serial of photographic monographs under the general title of "Encyklopädie der Photographie," an exhaustive work in every sense of the word.

Photographic Mosaics, 1896. Edward L. Wilson, New York. The well-known annual record of photographic progress in America. This the thirty-second volume is well illustrated with the best specimens of American half-tone process, and is replete with useful information contributed by well-known writers from at home and abroad. Orders may be sent to the publication office of this journal.

Ausfuhrliches Handbuck der Photographie. Vol. II.* Part 2. By Dr. Josef Maria Eder. Wilhelm Knapp, Halle, a. S., 1896. With fifty-four illustrations in text.

"The wet collodion process, ferrotypy and kindred processes, also a treatise on screen negatives for the autotype process." The appearance of this text-book has been long looked for, and like all of Dr. Eder's work is thorough and exhaustive. The typography, like all books issued by the great publishing house of Wilhelm Knapp, of Halle, a. S., is above criticism. We expect to publish some extracts from this work in the near future.

She was Spectacular. — A Widow Whose Ideas About Showing Grief were Peculiar.—A young widow in London engaged a presumably young photographer to take her picture while she leaned weeping over the tombstone of her "dear departed," says a Belgian exchange. On the day appointed the sentimental beauty in weeds went to the graveyard and at once opened the sluices of her great sorrow. She wept and wept for hours, but he came not. Finally she went dry and home, and straightway sued the photographer for the return of the money which she had paid in advance. The artist claimed that the appointment had been vague; that he went to the cemetery and waited three hours for her at the grave, also in vain. No, they didn't compromise by marrying each other. The Judge rendered a verdict against the photographer, because "the photograph, showing the undying fidelity of the pretty widow, might, if finished at the time agreed upon, have been instrumental in procuring her a second husband."

A Page for Women.

Some Bridal Don'ts.—There are several "don'ts" among the bridal superstitions. The bride must not take any hand in sewing her wedding gown, or making her wedding cake, if she wishes to be happy. She must not even try on her wedding costume in its entirety, nor must she, on any account, put on her wedding ring before the ceremony. She must not neglect to weep a little on her wedding day, no matter how happy she is, and she must be careful not to look at herself in the glass after her costume is completed and before she is actually married. That, and the donning of the complete outfit previous to getting ready for the ceremony, presages direst misfortune.

As for the color of her gown, white is usually chosen, but "there are others," for instance:

Married in white, you have chosen all right.
Married in gray, you will go far away.
Married in black, you will wish yourself back.
Married in red, you'd better be dead.
Married in green, ashamed to be seen.
Married in blue, you'll always be true.
Married in pearl, you'll live in a whirl.
Married in yellow, ashamed of the fellow.
Married in brown, you'll live out of town.
Married in pink, your spirits will sink.

Then, moreover, the bride must be sure to wear "something old and something new" if she wishes to be quite happy, and she must be sure not to put on her left shoe first that eventful morning of her wedding day. Is this enough? There are a few more bridal superstitions, I think, but will these do?

Though there has been so little snow this season it has been a white winter nevertheless. White wings, white furs and white satin neck ribbons are the insignia of fashion nowadays.

Orris powder made into sachets will give one's belongings the exact odor of violets.

The Trilby bouquet is one of white lilies and will be much in vogue at Easter.

One well-made gown is worth a dozen slipshod, poorly-put-together costumes.

Women who desire soft pretty tresses should eschew the curling iron.

Give an additional thread to the buttons on your new gloves and they will not be jumping off the first time you want to look particularly correct.

Linen gowns made over a color with the corresponding tint at neck and waist are chic features of a summer wardrobe.

Now that white wings may be bought for nineteen cents a pair they are disappearing from the hats of the ultra select.

Bees, lizards and dragon flies as natural as life will be seen nestling amid flowers and foliage on our summer hats.

Engagement cups and saucers in Delft ware are new.

Marie Antoinette modes will prevail next summer.

Gray gowns are being ordered for spring wear.

A steam bath is excellent for the complexion.

Language of the Eyes.—Unsteady eyes, rapidly jerking from side to side, are frequently indicative of an unsettled mind.

When the upper lid covers half or more of the pupil the indication is of cool deliberation.

An eye the upper lid of which passes horizontally across the pupil indicates mental ability.

Gray eyes turning green in anger or excitement are indicative of a choleric temperament.

The white of the eye showing beneath the iris is indicative of nobility of character.

Eyes with long, sharp corners indicate great discernment and penetration.

Eyes in rapid and constant motion betoken anxiety, fear or care.

People of melancholy temperament rarely have clear blue eyes.

The proper distance between the eyes is the width of one eye.

The downcast eye has in all ages been typical of modesty.

Small eyes are commonly supposed to indicate cunning.

Brown eyes are said by oculists to be the strongest.

Side-glancing eyes are always to be distrusted.

Wide-open eyes are indicative of rashness.

The upturned eye is typical of devotion.

Blue eyes are said to be the weakest.

Color is permissible in stationery, and, though white is exclusively used by many conservative women, note paper in pale gray or lavender, with silver monogram, is pretty enough to be its own excuse for being.

In the Twilight Hour.

SOME little lions have a great big roar.

THE head s never regenerated before the heart.

THE longest way to a man's heart is through his head.

AS a permanent investment, nothing pays like doing good.

SIN in its own clothes would never find a place to stay all night.

WHEN we are patient with some people it is only a successful pretense.

CHARACTER is somethtng that other people's lives have brought out in us.

HUMAN nature on the throne is no better than human nature in the gutter.

NEVER shirk duty for pleasure. Do your duty, and pleasure will be the res ult.

THE best preparation for doing great things is to be faithful in little ones.

THE greatest blockhead is the one whose mistakes never teach him anything.

ABOUT the hottest furnace into which a child can be cast is worldly prosperity.

THE man who champions everybody's cause has to wait until he dies for his pay.

PEOPLE who live to make others happy are always happy themselves.

PEOPLE sometimes think they need more grace, when all they need is more rest.

THE man who has the courage to admit that he has been in the wrong, is not a coward.

MORE mountains would be moved if there were more people with a grain of mustard-seed faith.

IT will not do to think that because we have overcome great temptations, it is not worth while to guard against little ones.

SIN has many fools, but a lie is the handle which fits them all.—*O. W. Holmes.*

ENVY is blind, and knows nothing except to depreciate the excellences of others. —*Livy.*

IF the heart do but long for him there is no wrong way to him; and if the heart-longing be lacking no way is right. —*Mark Guy Pearse.*

"IT would be as difficult to take an inventory of the benefits the world receives from the sunshine as to enumerate the blessings we derive from the Christian Sabbath."

WE have in life many troubles, and troubles of many kinds. Some sorrows, alas, are real enough, especially those we bring on ourselves, but others, and by no means the least numerable, are mere ghosts of troubles; if we face them boldly we find that they have no substance or reality, but are mere creations of our own morbid imagination.—*Sir John Lubbock.*